DR-1

Bad Grounds

sonic boundaries

2021

Index of Contents

Introduction

DR-1 Bad Grounds is a sample based synthesizer for Kontakt 6.2.2, built upon mains hum sounds. Although it was originally designed to create drones and soundscapes, it has also more general sound design capabilities like a real synthesizer.

The main controls of the instrument resemble those of a classic subtractive synthesizer: a multimode filter, volume envelope, filter envelope, 2 LFOs for volume and filter modulation, insert and send effects. Moreover, some additional advanced features are included, which take advantage of the Kontakt built-in granular engine for sample playback, for deeper sound manipulation.

There are 6 main instruments available, 3 for each sample used. In addition, several preset patches are provided with each instrument.

A bit of history

The main inspiration for DR-1 Bad Grounds goes back a few years. For some reason, at some point I thought that building a drone patch from mains hum sounds was a good idea, so I did it: I found this two quite good hum samples, loaded them in my sampling software (I was using Speedsoft VSampler at the time), looped them, added a volume envelope, filter, some effects and nothing else.

Years later, after switching to Kontakt and trying to convert the old instruments in the new format, I found back those drone patches and started experimenting with

KSP language to build a GUI around them. The first choice of controls to add to these old instruments was natural: the standard controls coming from synthesizers (filters, envelopes, LFOs, etc.). I realized that playing with these additional features it was possible to create patches completely different from the original drones like keys, organs, plucked instruments and even brasses or metallic bells: these were classic synthesizer patches, but without the rigid polyphonic limitations of analogue synthesizers.

These two simple ideas led to the creation of DR-1 Bad Grounds, the first of a serie of kontakt instruments focused on concrete, acousmatic and other experimental sounds. In creating instruments, I try to keep a musician-friendly attitude: they should be good to hear and versatile enough to tweak without losing the immediacy and fun of playability. I hope that DR-1 Bad Grounds has these qualities and that you have fun playing and creating sounds with it like I had fun developing it.

Ascanio Borga, August 2021

Installation

Just unzip the installation zipfile in his own folder and place it anywhere you like on your hard drive. It's important to keep the subfolders relative structure as it is, so that the Kontakt instruments can find their samples and other resource files.

A number of presets is provided both in the form of single instruments and instrument snapshots. Single instruments are located in the "*Single Instruments*" subfolder and can be loaded into Kontakt in the usual way, while the snapshots require a little additional manual installation, which is described in the following.

Installing snapshots

To install instrument snaphots, you need to copy the content of the "*Snapshots*" subfolder into the default User Content folder of your Kontakt installation, i.e. the default User Snapshot saving location. This folder may vary depending on your system, typical locations are:

- **On Windows:**

C:\Users\<Your Username>\Documents\Native Instruments\User Content\Kontakt\

- **On Mac OS X:**

Macintosh HD/Users/<Your Username>/Documents/Native

Instruments/User Content/Kontakt/

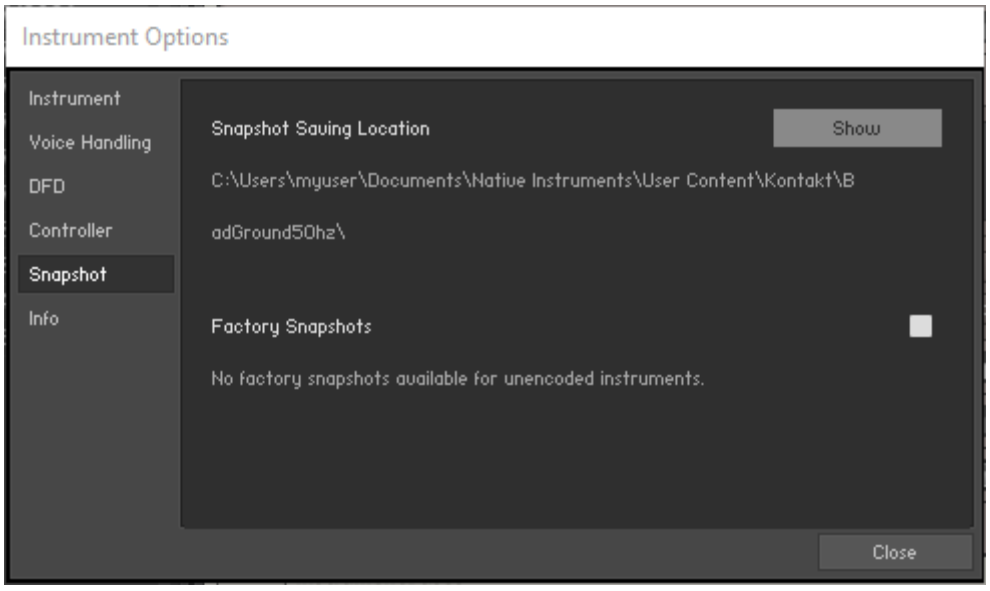
Note - The snapshot folder name must always correspond with the name of the main Kontakt instrument (*.nki).

Example - The default User Snapshot saving location for "BadGround50hz.nki" is:

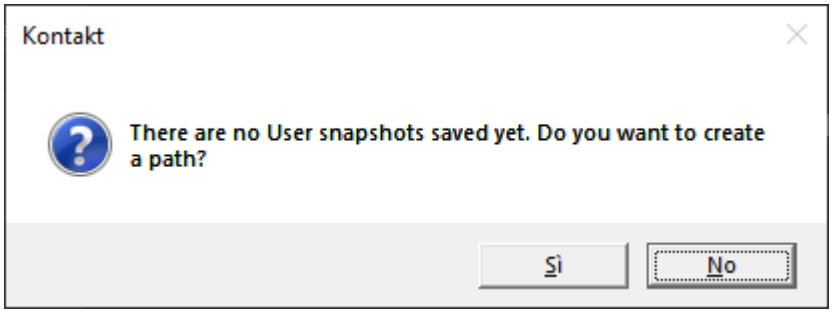
[…]/Users/<Your Username>/Documents/Native Instruments/User Content/Kontakt/BadGround50hz/

This folder contains the physical *.nksn files of the instrument snapshots.

You can also retrieve/create the default User Snapshot saving location for an instrument in Kontakt by entering Instrument Edit Mode and clicking on Instruments Options > Snapshot > Show.



If no User Snapshots folder has been created yet, Kontakt will ask you to create it in the first place: just click "Yes" to confirm.



If the snapshot are correctly installed, you will be able to browse, select and modify them in the instrument.

Requirements

DR-1 Bad Grounds requires a full version of Kontakt 6.2.2 (or above).

Overview

The user interface of DR-1 Bad Grounds is split in two pages:

- Main
- FX

The Main page contains the Filter section, Volume Envelope, Filter Envelope, LFO 1 & 2, and Vibrato controls:

The Main page of the _GTI and _GTO instruments contains an additional section in the upper right area, with specific controls for the native granular engines utilized:

The FX page, same for all instruments, contains control parameters for Insert effects (Bitcrusher, Distortion, Overdrive, Resonator, Phaser, Flanger, Limiter) and Send Effects (Delay, Replika):

Filter section

The multimode Filter is a sound processing component that modifies the spectral properties of a sound, and can be configured to work in different ways:

- Low Pass Filter – removes all frequencies above the cutoff frequency
- High Pass filter - removes all frequencies below the cutoff frequency
- Band Pass filter – allows only frequencies in a neighborhood of the cutoff frequency

The Filter section contains the 3 controls for the configurable multimode filter:

- Filter type selector
- Cutoff frequency
- Resonance

There are 7 types of filter available in the Filter type selector:

LP - P5	Pro-53 (Prophet 5 emulation) Low Pass filter, 4-pole (-24 dB/octave)
LP - 2P	standard Low Pass filter, 2-pole (-12 dB/octave)
LP - Ladder	classic "Ladder" Low Pass filter, 4-pole (-24 dB/octave)
HP - 2P	standard High Pass filter, 2-pole (-12 dB/octave)
HP - Ladder	classic "Ladder" Low Pass filter, 2-pole (-12 dB/octave)
BP - 2P	standard Band Pass filter, 2-pole (-12 dB/octave)
BP - Ladder	classic "Ladder" Band Pass filter, 2-pole (-12 dB/octave)

Note – In the standard 2-pole Band Pass filter (BP - 2P) only the Cutoff frequency control is active, the Resonance knob has no effect on sound.

Volume Envelope

The Volume Envelope describes how sound amplitude changes over time in relation of keyboard press/release events.

The Volume Envelope section contains the 4 standard controls for shaping the Volume Envelope curve:

- Attack time (time to reach 100% amplitude after note is pressed)
- Decay time (time to reach the sustain amplitude level)
- Sustain level (amplitude level to keep while note is kept pressed)
- Release time (time to reach 0% amplitude when note is released)

Filter Envelope

The Filter Envelope describes how filter cutoff frequency changes over time in relation of keyboard press/release events.

The Filter Envelope section contains the 4 standard controls for shaping the Filter Envelope curve, plus a general Amount control:

- Amount (how much the filter envelope effects the cutoff)
- Attack time (time to reach maximum cutoff frequency after note is pressed)
- Decay time (time to reach the cutoff frequency sustain level)
- Sustain level (cutoff frequency level to keep while note is kept pressed)
- Release time (time to reach minimum cutoff frequency when note is released)

Modulation section

Modulation is a standard technique of sound synthesis in which a target signal/parameter is modified by a modulator signal. Common source for modulator signals is a LFO, that generates periodic/random signals with a frequency range below the audible.

The Modulation section contains controls for 3 modulation sources:

- LFO 1 – volume modulation (tremolo)
- LFO 2 – cutoff frequency modulation
- Vibrato – pitch modulation

LFO 1

The first row of Modulation section contains the controls for LFO 1 (volume modulation, or tremolo):

- LFO 1 type selector
- LFO 1 amount (how much LFO 1 effects the volume)
- LFO 1 frequency
- Pulse Width (only for Rectangle LFO)

There are 5 types of LFO available in the LFO 1 type selector:

- Sine
- Rectangle
- Triangle
- Sawtooth
- Random

Note – Pulse Width parameter is active only for Rectangle type LFO.

LFO 2

The second row of Modulation section contains the controls for LFO 2 (cutoff frequency modulation), which are identical to LFO 1 controls:

- LFO 2 type selector
- LFO 2 amount (how much LFO 2 effects the cutoff)
- LFO 2 frequency
- Pulse Width (only for Rectangle LFO)

Like LFO 1, there are 5 types of LFO available in the LFO 2 type selector:

- Sine
- Rectangle
- Triangle
- Sawtooth
- Random

Note – Pulse Width parameter is active only for Rectangle type LFO.

Vibrato

The first row of Modulation section contains also another control for adjusting Vibrato Rate:

Vibrato is a pitch modulation driven by an hidden Triangle type LFO and with amount mapped to the Modulation wheel (MIDI CC 1).

Note – Since the Modulation wheel value is 0 by default, the Vibrato is initially inaudible. To hear Vibrato, and therefore changes in the Vibrato Rate, it is necessary to raise the Modulation wheel first.

Granular section

As mentioned above, DR-1 Bad Grounds takes advantage of some advanced features of Kontakt like the native granular engines: Time Machine and Tone Machine. In the Main page of the _GTI and _GTO instruments there is an additional section in the upper right area, with specific controls for these granular engines:

- _GTI patches use Time Machine engine
- _GTO patches use Tone Machine engine

Time Machine controls

Time Machine is a Kontakt native granular engine that is able to shorten or stretch your samples in real-time, while leaving their pitch unaffected.

The Granular section of the _GTI instruments contains the 4 controls for the Time Machine playback engine:

- Tune (changes the pitch without affecting the playback speed)
- Speed (changes the playback speed without affecting the pitch, setting the minimum value freezes the sound at its current playback position)
- Smooth (adjusts the shape of the crossfades between the grains)
- Grain (determines the grain size of the granular synthesizer)

Tone Machine controls

Tone Machine is a Kontakt native granular engine that is able to change the pitch and formants of your sounds independently from the playback speed.

The Granular section of the _GTO instruments contains the 4 controls for the Tone Machine playback engine:

- Tune (changes the pitch without affecting the playback speed)
- Speed (changes the playback speed without affecting the pitch, setting the minimum value freezes the sound at its current playback position)
- Smooth (adjusts the shape of the crossfades between the grains)
- Formant (shifts the formant frequencies independently of the pitch)

Effects

Effects are divided in two types: Insert Effects and Send Effects. The Insert Effects are organized in a chain that is applied directly to the input signal in the following order:

Bitcrusher → Distortion → Overdrive → Resonator → Phaser → Flanger → Limiter

while the Send Effects (Delay, Replika) are independently mixed with the output signal after the Insert Effects.

The FX page contains control parameters for both Insert Effects and Send Effects:

Note – Every effect can be turned on (switch up) or off (switch down) by clicking on the corresponding switch on the left side of the controls.

Bitcrusher

Bitcrusher is an audio effect that adds distortion and other artifacts to a digital audio signal by reducing its resolution or sample rate.

The Bitcrusher effect has 4 controls:

- Bits (resolution reduction control)
- Sample rate (sample rate reduction control)
- Noise (amount of noise added)
- Noise color (spectral character of the added noise)

Distortion

Distortion is an audio effect that increases the gain of an audio signal to produce a “fuzzy” tone.

The Distortion effect has 2 controls:

- Drive (gain control)
- Damping (attenuation of higher frequencies)

Overdrive

Overdrive is an audio effect that increases the gain of an audio signal to produce a "fuzzy" tone, similar to Distortion but warmer and smoother.

The Overdrive effect has 5 controls:

- Tone (brightness control)
- Drive (gain control)
- Bass (low frequency gain control)
- Bright (high frequency gain control)
- Clean (amount of clean signal mixed with the overdriven one)

Resonator

Resonator (Flair) is an advanced audio effect that combines 4 flangers (comb filters) to produce complex harmonic effects to deeply transform the original sound.

The Resonator effect has 6 controls:

- Mix (balances dry and wet signal)
- Amount (amount of modulation applied to pitch)
- Pitch (fundamental frequency of the first flanger voice in semitones)
- Rate (frequency of the modulation applied to pitch)
- Voice (smooth fade from one to four flanger voices)
- Detune (alters the pitch of each individual flanger voice)

Phaser

Phaser is an audio effect that that splits an audio signal in two and alters phase relationships in one of the two parts with an all-pass filter, which is modulated by an internal LFO.

The Phaser effect has 4 controls:

- Depth (amount of LFO modulation)
- Speed (LFO modulation speed)
- Phase (LFO phase difference between the left and the right stereo channels)
- Feedback (emphasis of the comb filter effect)

Flanger

Flanger is an audio effect that splits an audio signal in two and delays one of the two parts in relation to the other one. The delay time is modulated by an internal LFO.

The Flanger effect has 5 controls:

- Depth (amount of LFO modulation)
- Speed (LFO modulation speed)
- Phase (LFO phase difference between the left and the right stereo channels)
- Color (spectral character related to delay range)
- Feedback (amount of feedback loop)

Limiter

Limiter is a special form of compressor with a ratio of one to infinity, a threshold just below the maximum level, and a very short attack time.

The Limiter effect has 1 control:

- In gain (gain of the input signal)

Delay

Delay is an audio effects that records an input signal and plays it back after a period of time.

The Delay effect has 4 controls:

- Time (delay time in milliseconds)
- Damping (attenuation of higher frequencies)
- Pan (amount of ping-pong effect)
- Feedback (amount of feedback loop)

Replika

Replika Delay is an advanced delay effect that works in different modes and reproduce diverse types of delay and reverb. In DR-1 Bad Grounds it is used in “Diffusion” mode to deliver huge and thick reverb effects.

The Replika effect has 5 controls:

- Time (delay time)
- Feedback (amount of feedback loop)
- Amount (amount of diffusion applied to the delay signal)
- Size (reverb size)
- Modulation (amount of modulation applied to diffusion)

Tech specs

- 6 main instruments
- 71 presets (snapshots/single instruments)
- 3 playback engines
  - DTD
  - Time Machine
  - Tone Machine
- 2 samples
- 1 multimode filter (7 types)
- 1 volume envelope
- 1 filter envelope
- 2 LFOs for volume/filter (5 types)
- 1 vibrato rate
- 7 insert effects
  - Bitcrusher
  - Distortion
  - Overdrive
  - Resonator (Flair)
  - Phaser
  - Flanger
  - Limiter
- 2 send effects:
  - Delay
  - Replika

Changelog

Version 1.0 (August 2021)

- first release

Credits

- Programming: Ascanio Borga
- GUI design: Ascanio Borga
- Preset sound design: Ascanio Borga
    - Additional preset sound design: Davide Del Col